DOCUMENT RESUME

ED 272 499 SP 027 920

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TITLE Craftsmen and Scholars: The Case for Academic Majors in Teacher Education.
INSTITUTION Coalition of Teacher Education Programs.
PUB DATE 85
NOTE 45p.
PUB TYPE Reports - Descriptive (141)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Academic Education; Critical Thinking; Elementary Secondary Education; Higher Education; *Intellectual Disciplines; *Preservice Teacher Education; Problem Solving; Scholarship; *Teacher Education Programs

ABSTRACT

This paper delineates several of the major problems confronting teacher educators, public school instructors, and school corporations today: changes in public school populations; difficulties in recruiting quality teacher education candidates; and problems in initiating significant changes in teacher education programs. It makes a plea for the creation of more stimulating academic programs at all educational levels. Desirable attributes of these recommended instructional components are described, and their importance to the development of pupil problem-solving and reasoning skills are noted. In addition, a three-phase teacher education program (with prominent academic features) is detailed. The appendices include a course evaluation chart for an elementary education program, a summary of recent changes in institutional teacher education requirements in Indiana, and a set of problem situations that require critical thinking for their solutions, as well as a four-page outline by Robert Ennis entitled "Goals for a Critical Thinking Curriculum." (JD)

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CRAFTSMEN AND SCHOLARS: THE CASE FOR ACADEMIC MAJORS IN TEACHER EDUCATION

by

Donald L. Barnes

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Coalition of Teacher Education Programs
Indiana University
1985

SP027920

This paper was commissioned by the Coalition of Teacher Education Programs, a cooperative project to improve teacher education involving Ball State University, Butler University, Indiana University, Indiana State University, Purdue University, and the University of Evansville.

CRAFTSMEN AND SCHOLARS

The Case for Academic Majors in Teacher Education

This paper delineates several of the major problems confronting teacher educators, public school instructors, and school corporations today: changes in public school populations, difficulties in recruiting quality teacher education candidates, and problems in initiating significant changes in teacher education programs. It makes a plea for the creation of more stimulating academic programs at all educational levels. Desirable attributes of these recommended instructional components are described, and their importance to the development of pupil problem-solving and reasoning skills are noted. In addition, a three-phased teacher education program (with prominent academic features) is detailed at the close of this discussion.

Teachers Face Perplexing Challenges in the Eighties

It is virtually impossible to discuss the issue of academic majors for teachers without noting several other important dimensions of the educational scene. Not the least of these concerns centers on the fact that we are not preparing teachers today for the same world that greeted their predecessors a generation or two ago. Lortie (1975) notes that three or four decades ago educators often pointed to the pride associated with public service, the enjoyment of working with young people, the ease of movement in and out of the profession, and time compatibility as important and appealing considerations in choosing educational careers. Sykes (1983) sketches a very different set of circumstances facing today's pedagogues. There is a deteriorating public image of teaching, students are less responsive, and classrooms all too frequently are disruptive or dangerous.

A few schools are little more than warehouses for troubled kids. New York City, for example, has a 40% dropout rate; and the Detroit School Board recently voted to install metal detectors at the main entrances to most city high schools. Drugs and unwanted pregnancies are an integral part of teenage life. At one high school in the northern part of our state, the girls basketball coach found that four of the five players in her starting line-up were pregnant. Some hard decisions had to be made. Under these circumstances survival, not cultural enrichment, may become the hallmark of success. And for teachers, survival may be insular and lonely; much is being written today about the sense of isolation that teachers frequently experience because they are isolated both physically and psychologically from their colleagues (Ashton, 1984).

Demographic trends also do not presage a bright future. Our aging population may be less interested in financing education; and our growing minority enrollments may require greater patience, broader incentives, and far more remedial assistance. In addition, the "bright flight" of talented students to private schools and academies continues unabated. These factors, and many others that might be cited, could lead us to abandon the ideal of the common school and any pretense of being an academic community.

Legislatures and state departments of education have addressed the growing number of social problems by mandating a plethora of courses and instructional units. Schools now promote firearms safety, good grooming, effective interpersonal relationships, CPR, personal health maintenance, child care, physical fitness, driver training, home planning, and career competencies, as well as basic life skills. They also have programs to combat unwanted pregnancies, drug addiction, smoking, teenage suicide, and other social ills. Each of these programs usurps time, space, and energy from traditional academic pursuits. The public seems to want a smorgasbord of offerings with something for everyone. Yet they are clearly disinclined to lengthen either the school day or the school year (AACTE School Briefs, September, 1985). Typically, as soon as new programs or courses of study or technological innovations appear, they are wedged into the already overcrowded, disjointed curriculum.

The Best Either Don't Enter the Profession or They Leave Early

Although some academically able candidates pursue educational careers, teaching draws disproportionately from the lower academic ranks. In a longitudinal study of white, female North Carolina teachers who entered the profession in 1973, Schlechty (1981) found that many more top scorers than bottom scorers on the National Teachers Examination left teaching within 7 years. At the close of the 7-year period, almost two-thirds of the top decile had left, while only one-third of the bottom decile had departed. This has left us with a severe shortage of qualified instructors. The National Center for Education Statistics (1983) points out that in 1981, the most recent year for which adequate figures are available, less than half of the newly employed science and mathematics teachers in the nation were certified in their respective areas. In fact, fewer than two-thirds of the newly hired teachers in other secondary subject areas were qualified. As a result, we have experienced a deintellectualization in teacher education. This, in turn, seems to discourage additional talented people from entering and persisting in the field.

In addition, a majority of these teacher candidates come from home and family environments where thinking and reasoning are not highly valued. Prichard, Fen, and Burton (1971) found that a disproportionately small percentage of teacher educators came from homes of professionals, executives, and private entrepreneurs. Quinby (1985) recently reviewed the investigations of Robert Sternberg, which clearly demonstrate that upper- and lower-class parents typically perceive intelligence differently. The socially and economically advantaged often emphasize problem-solving and reasoning skills with their children, while lower-class parents tend to view intelligence as rote memorization. Kohn and Schooler (1982) suggest that the accumulative effects of child-rearing patterns, formal education, and occupational orientations on children from lower- and lower-middle-class families reinforce conformity rather than flexibility.

Teacher Education Students Have Reservations About Their Undergraduate Programs and Lengthy Teaching Careers

Undergraduates appear to expect very little from teacher education programs. Book, Byers, and Freeman (1983) found that many college students enter teacher education programs believing that there is no particular core of professional knowledge that will significantly enhance their teaching effectiveness. They view teacher educators as people who can help them gain access to public school classrooms, where their own natural parenting instincts and common sense will allow them to work out the routines needed for success. Fortunately, most elementary education majors and many secondary education majors do appreciate the significance of their educational methods courses before graduation.[1]

Prospective teachers seem to expect easy access to teacher education, minimally challenging work, courses with little academic value, and relatively short professional careers. Two out of every five students of the 400 undergraduates Book, Byers, and Freeman (1983) interviewed did not expect to be teaching ten years later. This same tentative commitment to teaching is reflected in the findings of Anderson, Stacey, Western, and Williams (1983), who studied the careers of 1,490 Australian students in engineering, law, medicine, and teaching over a 13-year period. These researchers found that those in teaching did not acquire the value orientations that are characteristic of professionals in engineering, law, and medicine. Anderson and his colleagues (1983) also found that the teachers in their sample were most likely to leave their profession, often to raise families of their own.

Teacher Educators Have Been Generally Unresponsive To Calls For Change

Schools and colleges of education must rank among the most immovable, intractable institutions in the nation. Martin Haberman, editor of the Journal of Teacher Education, after reviewing a series of articles offering proposals for changes in teacher education, noted that such recommendations are most likely to involve organizational or administrative modifications; they seldom suggest substantive changes. We seem to have an unflagging faith that changes in course hours, course sequences, or certification requirements will somehow upgrade the quality of our graduates. Yet such requirements for certification as course completion, program approval standards, and written examinations bear only a tenuous relationship to the skills and personal qualities that contribute most directly to effective teaching.

Truly substantive proposals for changes in teacher education are hard to find, with some notable exceptions. James Conant and his colleagues offered a detailed plan for the improvement of teacher education in 1963; and his report, The Education of American Teachers, quickly became a best seller.

[1]See Appendix A for elementary education students' evaluations of BSU undergraduate offerings.

AACTE countered with a proposal of its own, the TEAM project, an elaborate plan issued in two parts in 1964 and 1967. The TEAM proposal emphasized closely delineated professional concepts and skills but seemed to be too intricate for many colleges of education to implement. In 1966 and 1968 the U.S. Office of Education sponsored two additional plans: Teachers for the Real World, emphasizing a multicultural point of view, and CETEM, a federally funded effort to improve elementary teacher education through closely-articulated competency-based curricula.

It seems that in teacher education we either build castles in the sky that are beyond our reach or tinker with course hours and certification standards. In Indiana we lean toward tinkering. We have raised grade point requirements at various points in the undergraduate sequence, mandated early field experiences, and introduced specific screening procedures (examinations in reading and writing and, in some instances, tests for oral expression, speech & hearing, and mathematics).[1]

There are at least three reasons why teacher education programs change slowly. First, the sheer size of the teacher education establishment mitigates against widespread innovation. More than 1,200 institutions, more than 70% of all four-year colleges and universities, educate teachers. And despite the decline in the demand for teachers in the past decade, 49 additional institutions initiated degrees in education during this period. AACTE and NCATE, the two governing bodies, can hardly keep track of their members, much less provide decisive leadership. Many of the smaller institutions survive on slim resources and cannot afford the specialized personnel and course offerings that are normally a part of new programs.

Second, faculties of education are veterans of infighting and intrigue. They have mastered survival instincts that go with being a perennial unwanted stepchild. They are not looking for utopias; they typically view their surroundings through a maze of turf battles centering on major and minor requirements, course sequences, prerequisites, and FTEs. Jobs and budgets are always at risk. These constant maneuverings leave little time or energy for fashioning imaginative new programs. There is a persistent, gnawing fear that change, any change, might afford an adversary an opportunity to make new inroads into mutually coveted territory. Because of these constant struggles, they never get around to using in their institutions the research findings they espouse in educational psychology classes. Its usage is limited to what each individual faculty member emphasizes in his or her own institutional role.

Third, we have not yet identified reliable affective predictors of college student success beyond the standard high school rank indices and national test scores that have been used for decades. A recent volume, Success in College: The Role of Personal Qualities and Academic Ability

[1]A more detailed delineation for each state institution is listed in Appendix B.

published by the Educational Testing Service, notes that data on certain types of extracurricular involvements in high school eventually may serve as predictors of success. Verbal fluency also has been mentioned as a potential predictor of success in teaching. Still, there are no specific affective generic anchors (attitudes, beliefs, etc.) that we can use as reliable predictors.

"Trivial Pursuit" Could Very Well Serve As The Slogan For Our Age

Gerald Bracey of the Virginia Department of Education, writing in the "My Turn" column of Newsweek (October 28, 1985), laments what he calls our "world of bits and pieces". He's convinced that we are processing tiny slivers of information at a dizzying rate. We seem to be fascinated with relatively useless facts. These often become the focus of TV game shows, crossword puzzles, and sports commentaries. The Sesame Street syndrome, in which the attention of the viewer is demanded for only a few moments before the program shifts to another topic, is now found in news, mini interviews, and other TV programs.

This addiction to rapid movement and trivia seems to manifest itself early and last through graduate school. Herbert Zimiles of the Bank Street College of Education asked seasoned elementary teachers how kids today differ from those starting school a generation ago. The teachers he interviewed believe that children today enter school with a wide range of fragmentary facts but lack the skill to synthesize or organize the information into meaningful relationships. They simply do not focus on a topic long enough to make any sense of it. Likewise at the graduate level, we are confronted with immense mountains of data. In science alone, there are more than 40,000 professional journals. To keep these periodicals current, writers are publishing articles at the rate of one every 30 seconds.

The New Emphasis On Critical Thinking and Reasoning Skills

It has become increasingly obvious to educators, not only in this country but in other nations as well, that we are not effectively helping pupils to identify, develop, and utilize the wide range of thinking and reasoning skills of which they are capable. Edward de Bono, Director of the Cognitive Research Trust in Cambridge, England, has noted that Venezuela, Canada, the United Kingdom, Erie, Australia, and New Zealand all have launched large programs for the teaching of thinking skills. There also are pilot projects in Bulgaria, Malaysia, New Guinea, India, and Israel.

In this country, various states have invested enormous amounts of time and money in educational assessments and new critical thinking and reasoning programs. The Connecticut State Department of Education has joined forces with cognitive psychologists and a testing corporation to produce a 4th-grade mastery test that assesses thinking skills. They plan to follow up with curriculum and training materials. In New Jersey, the Board of Higher Education has established the Basic Skills Assessment Program. The program has two mandates: to evaluate the basic thinking skills of all first-year students entering state colleges in New Jersey and to assess the effectiveness of the remedial assistance provided to entering students at these institutions.

California has been the leader in the "critical thinking" movement. Five years ago the entire 19-campus California State University system instituted a requirement that all graduates demonstrate

> ...an understanding of the relationship of language to logic, leading to the ability to analyze, criticize, and advocate ideas, to reason inductively and deductively, and to reach factual or judgmental conclusions based on sound inferences, drawn from unambiguous statements of knowledge or belief.

California's community college system has instituted a similar requirement; and this year the State Department of Education is preparing to test all eighth-grade students, using examinations in which more than a third of the items have been designed to assess critical thinking skills.

Twenty nationwide educational organizations - including academic societies, administrators' groups, and teachers' unions - have joined ranks in a concerted effort to stop the decline of students' thinking skills.[1] They have established a "Collaborative on Thinking" with two major priorities: to promote the teaching of academic content in ways that develop and encourage student thinking and to ensure that students are explicitly taught cognitive skills. This effort is being made in response to a pervasive belief that schools have failed to train students to become active questioners and to approach problems in an analytic and systematic way. It is no secret that scores on the National Assessment of Educational Progress show an erosion of higher-order skills.[2] In addition, G. H. Hanford (1983), President of the College Board, has noted that "the decade-long decline in test scores appears largely due to the fact that reasoning ability in secondary schools is not what it used to be."

There is a good deal of agreement among educators that we can no longer afford the luxury of ill-prepared graduates with few insights and little command of their own cognitive and affective processes. Many educational leaders believe that, if students are to cope successfully with new market conditions, critical thinking skills are more crucial than ever. A majority of the new job openings will occur in the information and service fields, and the most lucrative and attractive of these opportunities will require well-developed cognitive skills - such as the ability to collect and synthesize data, see relationships, make comparisons, draw inferences, and support arguments with facts. In a recent survey of electronics firms in California's Silicon Valley, Needels (1982) notes that business leaders who were asked to identify the competencies most lacking in their recently hired employees placed problem-solving skills at the top of the list. The respondents believe that these skills are

[1]These organizations are listed in Appendix C.

[2]These changes in scores are given in Appendix D.

needed by employees at all levels. This weakness in problem solving should come as no surprise. John Goodlad's descriptions of classroom activities in A Place Called School emphasize that students are seldom expected to express or respond to ideas. Most teachers simply ask students to recall information from textbooks and use "drill and skill" exercises.

One of the most intriguing arguments offered as a rationale for teaching critical thinking and reasoning centers on the belief that students have a moral right to be taught how to think for themselves. An individual who cannot or will not make important personal decisions is dependent on others. This dependence restricts his activities, undermines his self-determination, and detracts from his sense of personal worth. If we want students and adults to feel reasonably comfortable in puzzling or ambiguous situations, and if we want them to welcome occasions that require self-initiative, they must be given opportunities to develop these skills and to learn to work out tentative solutions to problems for which simple answers may not be readily available. According to Robert Ornstein (1980) of the Institute for the Study of Human Knowledge, modern problems call for better thinking at all levels.

> Solutions to the significant problems facing modern society demand a widespread, qualitative improvement in thinking and understanding. We are slowly and painfully becoming aware that such diverse contemporary challenges as energy, population, the environment, employment, health, psychological well-being of individuals and the meaningful education of our youth are not being met by the mere accumulation of more data or the expenditure of more time, energy, or money. In view of the increasing pressures imposed on our society by these problems, many responsible thinkers have realized that we cannot sit back and hope for some technological invention to cure our social ills. We need a breakthrough in the quality of thinking employed both by decision-makers at all levels of society and by each of us in our daily affairs.

The teaching of critical thinking and reasoning skills can even enhance the realization of short-term goals. An experimentally controlled study on the utility of thinking-skills training for improving SAT scores was reported by Worsham and Austin (1983). They found that a group of high school seniors who took part in a thinking-skills program called Strategic Reasoning made significantly greater gains on the SAT than a comparable group of nonparticipating students. The Strategic Reasoning program teaches students to analyze classifications, serial order, cause-effect associations, and other relationships.

Finally, it may be helpful to recognize that students, even at the elementary school level, frequently encounter out-of-school problems that require careful thought and analysis. In an attempt to identify some of these difficulties, 45 elementary students were interviewed. Almost without exception, the interviewees seemed puzzled when they were first asked to identify and describe personal problems. Perhaps they felt that admissions of this kind

were a sign of indolence or carelessness. However, after each child had sorted through his or her list of tribulations and grievances, a surprising range of fairly perplexing personal difficulties emerged.[1]

And, almost without exception, the problems they identified required thinking skills that we ordinarily do not teach in school. In most cases they had to draw inferences before making judgments, as well as understand such relationships as the use of incentives and the division of responsibilities. They also had to generate alternatives and assess the ramifications and anticipated efficacy of each of the alternatives they identified. If these children are representative, we shouldn't think of problem-solving skills primarily as keys to future success; these students could make good use of these analytical competencies in their current life.

What Do Academic Studies Have To Do With The Development of Thinking Skills?

None of us needs to be reminded that extraordinary speeches, profound books, and memorable debates derive much of their power from the depth and magnitude of their content. A speaker or writer with little knowledge of his subject is boring. Furthermore, his crippling ignorance will prevent him from offering critical viewpoints and penetrating insights. Raymond Nickerson (1984), Senior Vice President of BBN Laboratories, Cambridge, Massachusetts, summarizes some of the relationships between knowledge and thinking.

> Thinking is a totally knowledge-dependent activity; to think, one must think <u>about</u> <u>something</u>. Other things being equal, the more one knows, the more effective one's thinking is likely to be. Much knowledge does not guarantee effective thinking, but lack of knowledge surely prohibits it. We cannot think effectively about physics, or politics, or baseball unless we know something about physics, politics, or baseball. In general, our ability to deal effectively with the intellectually demanding problems that we encounter in life is as constrained by the lack of specific knowledge germane to those problems as it is by the inadequacy of our general reasoning and problem-solving skills. Knowledge and thinking ability are interdependent and mutually reinforcing; attempting to develop one without the other is like trying to make cloth with only one side.

It seems odd that we must periodically document the fact that teachers with strong academic backgrounds in the subjects they teach have more knowledge to offer students than their less-informed colleagues. This appears to be true despite the findings of investigators, which raise doubts about the rigor of typical liberal arts undergraduate offerings (Galumbos, Cornett, and Spitler, 1985). Hawk, Coble, and Swanson (1985) found that students of mathematics teachers who were certified "in-field" registered higher achievement gains than students of teachers who were certified to teach but did not have mathematics certification.

[1]Statements from these interviewees can be found in Appendix E.

The most extensive study of subject matter knowledge on teaching effectiveness was reported by Druva and Anderson (1983). These investigators found that science courses, education courses, and overall academic performance are positively associated with successful teaching. Furthermore, the relationship between teacher training in science and cognitive student outcomes is progressively higher in upper-level science courses.

When we examine the typical collegiate major or academic area of concentration, we may wonder how, in their current condition, these studies can appreciably strengthen a teacher's effectiveness. The Association of American Colleges (1985) has recently examined course offerings and expressed serious reservations concerning academic majors. In Integrity in the College Curriculum: A Report to the Academic Community, they point out:

> The major in most colleges is little more than a gathering of courses taken in one department, lacking structure and depth. Catalogs ask the student to pick eight of the following courses, and there might be 100 listed. (p. 12)

The authors of the report suggest more defensible ways of viewing the academic major:

> The academic major should emphasize inquiry, abstract thinking, critical analysis. If anything is given attention in our colleges and universities, thinking must be it. (p.24)
>
> Study in depth is not so much an additional component of the curriculum as it is recognition of the degree of complexity and sophistication with which the various areas are interrelated and understood. (p.37)

Certainly, if a teacher education candidate is to comprehend clearly the concepts within a discipline and make use of these ideas within his or her own teaching, the candidate must understand something of the structure and logic of the discipline. Bell (1966) and Hirst (1965) believe that the emphasis in all liberal studies should shift from the content of the disciplines and fields of knowledge to their epistemological foundations and modes of inquiry. The focus, in other words, ought to be on the structure, investigative strategies, principles of explanation, and nature of verification. It is not enough for students simply to learn the content of academic disciplines; to be truly informed, students must be able to think in those disciplines.

Raths (1980) suggests three priorities or goals that should characterize the outcomes of academic studies in programs for teacher education candidates:

1. Students should be aware of and concerned about the ways in which information is generated and tested.

2. Students should be sensitive to the distinction between findings and explanations for findings.

3. Students should recognize that while many explanations may be advanced for certain phenomena, some may be more valid than others.

William James warned against our penchant for superficial information, which he labeled "knowledge of acquaintance". McDermott (1977) quotes James as follows:

> In general, the less we analyze a thing, and the fewer of its relations we perceive, the less we know about it and the more our familiarity with it is of the acquaintance type.

Since many educational leaders and professional organizations recognize the importance of preparing well-educated teachers, it is not difficult to find statements of support. James Conant and his colleagues and the recently formed Holmes Group favor strong academic preparation; Carnegie's Ernest Boyer and B. O. Smith (1980) also emphasize the need for strong academic areas of concentration. Smith argues for in-depth preparation of prospective teachers in both the subject matter they will teach and in complementary areas. In one recent review of research in teacher education, Evertson, Hawley, and Zlotnik (1985) conclude with a recommendation that a strong liberal arts component be included in every teacher education program. Fortunately, significant progress is being made in this direction. Thirty-eight per cent (38%) of the institutions responding to a recent AACTE survey (1985) indicated that they had increased academic content requirements during the 1983-84 school year. Many believe that how courses are taught is just as important as the content. Gamson (1984), for example, studied 14 lively but very different undergraduate programs. It is her belief that significant educational experiences are best achieved in learning communities that have coherent goals, structure, and ambience and where the participants know what is to be accomplished. According to Gamson, there can and ought to be publicly articulated educational purposes, and these goals should be explicitly expressed in the teaching, classroom structures, and curricula. These should be active learning communities with an emphasis on critical thinking, creative problem-solving, and decision-making.

Why All Instructors, Including Elementary Teachers, Ought To Have Academic Majors

There are at least six important reasons why all regular teachers should have a major academic area of study:

1. Teachers who are thoroughly grounded in a body of knowledge ought to have a better grasp of the structure and logic of the discipline. They should

be able to sense the hierarchical order of ideas, the linkages between important concepts, methods of verification, and the major issues or unresolved questions in the field. This, in turn, should make it possible for them to plan for their classes more effectively and to establish instructional priorities as well as developmental learning sequences.

2. Ausubel (1978) and his colleagues have demonstrated over a period of two decades that when students are learning new material, the teacher's use of advance organizers will consistently yield a 12 to 20 percent increase in pupil scores. Ausubel defines advance organizers as:

> ...introductory material at a higher level of abstraction, generality, and inclusiveness than the learning passage itself, and an overview as a summary presentation of the principal ideas in a passage. (Ausubel, 1978, p. 25)

Ausubel also points out that advance organizers should be formulated so that they take into account ideas and concepts already present in the cognitive structures of the learners. The effective use of advance organizers, therefore, presupposes two conditions: (a) It takes for granted that the teacher knows something about the students' background knowledge; and (b) It assumes that the teacher has a broad enough grasp of the subject matter to offer structuring statements and organizational concepts at a higher level of generality. A teacher with limited background knowledge obviously will be at a disadvantage; a teacher who is thoroughly familiar with the subject matter under discussion should be able to formulate advance organizers without difficulty.

3. Teachers must feel comfortable with the major concepts in an area of study before they can help their students reason inductively, analyze data, test hypotheses, advance and evaluate ideas, identify relationships, draw conclusions, and participate effectively in other kinds of critical thinking and reasoning tasks. If a teacher is only one step ahead of the students in learning the material, she will have little time to think critically about the topics under discussion.

There are important risks associated with the teaching of thinking skills. Classroom activities slow down when students find the tasks challenging or risky.

> This reduction in instructional pace can seriously affect classroom management. In addition, student error rates increase. As a result, students frequently try to negotiate with the teacher, often asking for increased explicitness or more generous teacher evaluations. (Doyle & Carter, 1984)[1]

4. At the elementary level, the textbooks in science and social studies offer very thin fare. Fourth-, fifth- and sixth-grade texts race through ancient civilizations, modern-day America and its neighbors, as well as Europe, Asia, and Africa like Phineas Fogg on his famous eighty day tour of the world. The teacher who lacks a sense of history, tradition, and culture hardly can help her charges make sense of this material.

5. A major academic area of study should add a dimension of scholarship and dignity to the profession. All too often, our critics suggest that our primary and intermediate instructors are little more than caretakers or surrogate mothers. This image could change if elementary teachers mastered an academic area along with their studies in professional education.

6. Since teaching often draws candidates with limited academic credentials, a more thorough introduction to scholarly studies should help them remedy important deficits in their own knowledge.

We might be pleasantly surprised by the response of elementary teacher candidates to the prospect of pursuing academic majors as part of their undergraduate programs. Elementary teaching gives young adults a chance to work with children, but it also offers unlimited opportunities to learn. Jantzen (1981) analyzed the motivations of California teacher education undergraduates between 1946 and 1979. He found that financial security and the opportunity to work with the young rank high, but a growing percentage of prospective teachers choose the profession because it offers a lifelong opportunity to learn. In 1979, 71% of the female respondents answered positively when asked about their interest in continuing to acquire knowledge as a major advantage to a teaching career.

What Would An Academic Major for Elementary Teacher Education Candidates Look Like?

Primary teachers (K-3) might benefit most from majoring in language arts. The major could include composition, children's literature, etymology, histrionics, applied linguistics, the structure of language, the historical development of language, the development of language in children, and, of course, the teaching of reading. In this way, primary teachers would develop not only

[1]Goals for a critical thinking curriculum developed by Robert Ennis are listed in Appendix F.

competence but also an affinity for language. It is difficult to overestimate the importance of language. Good communication (listening, speaking, reading, and writing) contributes significantly to the development of every individual, no matter what his background or talents may be. People simply cannot exist as complete, knowledgeable, sensitive human beings without an intricate network of communications.

The major for upper-grade elementary teachers (4-6) might very well focus on the natural and social sciences. The content of the major could parallel the content of these offerings in the elementary school. We typically find studies in the three major divisions of science, i.e., (a) the earth and the universe, (b) life sciences, and (c) the physical sciences. Approximately half of the content normally is devoted to the biological sciences. In elementary social studies we typically find the entire range of history from prehistoric man and ancient civilizations to modern countries (with an emphasis on Western cultures, particularly the United States). In addition, upper-grade children learn about geography and the many ways man seeks to meet his basic needs.

One reason for suggesting the natural and social science major for upper-grade teachers is that it has become increasingly clear that significantly more instructional formats are used by elementary teachers in these subject areas. Stodolsky (1984), for example, found 18 different instructional formats being used in elementary social studies classes but only four or five formats in elementary math classes. In other words, the range of possible classroom activities appears to be much greater in science and social studies. An upper-grade elementary teacher who is helping her students to explore a wide range of library resources and to conduct controlled experiments or field trips probably needs a greater command of these fields of study than a teacher who is escorting her children through the basal reader or textbook in math. Reading and mathematics at the elementary level change more slowly, and they frequently offer more detailed instructional suggestions for the teacher. This is not meant to suggest that reading and math are of less importance.

How Do We Add Academic Majors To An Already Crowded Undergraduate Teacher Education Program?

Fortunately, one of our sister institutions has succeeded in developing a significant subject matter concentration for its elementary education majors. Purdue has a 70 to 72 semester-hour requirement in a combined general education and subject matter concentration for elementary majors. It appears that only 16 hours of this total focus on teaching methodology (children's lit.; math for elementary teachers 101, 102, 103; teaching music in elementary schools; and art experiences for the elementary teacher). Even if we were to count these as part of professional education rather than academic studies, we would still have a 56-hour subject matter concentration. A subject matter major seems to be a viable option under Indiana law.

A Triadic Model for Learning To Teach

Much has been said in this paper about the development of critical thinking and reasoning skills and their relationship to an academic major

or area of concentration. The teaching of thinking skills or the use of thinking skills in elementary and secondary classrooms must be viewed as the capstone to other, more fundamental learning experiences. We could conceive of these as falling into three levels:

Phase I

The first level might be labeled Studying Classrooms and Schools. The emphasis would be on learning about the vast variety of curriculum resources, the roles of school personnel, classroom management systems, characteristics of children, and instructional priorities. Students would be taught to use a variety of high-inference and low-inference classroom assessment instruments. Through these evaluative activities, they should become increasingly aware of the many diverse dimensions of learning environments. We have not begun to realize the potential that such studies of classroom environments may produce. After all, modeling still continues to be the major mode of instruction in human relationships.

Phase II

We are fortunate to live in a time when specific instructional strategies have been rather clearly delineated. There are several excellent models. The Madeline Hunter Model has had wide appeal. It is based on the assumption that each teacher is confronted with a series of decisions, and it is the skill with which she makes these decisions that determines the effectiveness of her instruction. It starts with task analysis and learning goals and continues with judgments concerning student motivation, rate and degree of learning, the retention of concepts and skills, and the transfer of learning to new situations.

The point to be made here is that we can select models that reflect our institutional priorities and can teach delivery systems quickly and efficiently. This should save a great deal of time.

Phase III

Our job is only half finished when we have taught undergraduates how to use instructional delivery systems effectively. We now have good technicians. When we finally teach them to foster critical thinking skills in their own classrooms, we are reaching a level that taps the basic roots of human potential. If the professors who teach the courses in the major have done their jobs well, these undergraduates should already be aware of what it means to reason inductively and deductively, to analyze, and to advocate and defend ideas. Here, too, there are many models to choose from. At this point, it might be useful to begin with Robert Ennis' goals for a critical thinking curriculum outlined in Appendix F.

APPENDIX A

PURPOSE OF THE SURVEY

This study was initiated to determine how courses that make up the Elementary *Education Sequence are perceived by college students majoring in Elementary Education* and Special Education.

A total of 193 students (registered in upper division courses) were surveyed. They were asked to rate all courses as "of great value", "of moderate value", or "of little value". They could rate them in relation to their general life activities or as they assisted them in preparing to teach. Responses were anonymous.

It is unfortunate that time did not permit the collection of responses from student teachers in the field. Very few student reactions are recorded for these offerings.

Those who examine these findings may be surprised at the large frequencies recorded in the column - "Have not taken course". There are several reasons for this:

A. Students, on occasion, cannot recall courses by title.
B. Many students receive transfer credits that allow them to skip courses.
C. In some instances, students have simply neglected to take courses in the early sequences.
D. In many cases a course may be but one among many from which the student may select.

It is not surprising to find that students frequently cite a particular professor they had as the reason they enjoyed or disliked a specific course.

There are two sets of figures on the accompanying chart. The figures in the four columns to the right are simple frequencies showing how respondents rated each course; the figures in the left-hand column are percentages. They indicated how many respondents who actually rated a particular offering rated it "of great value". The percentages do not take into account the respondents who indicated that they had not taken the course.

FINDINGS OF THE STUDY

If we examine the percentages, we find that 50% or more of respondents (who recorded frequencies in the first three columns) rated thirteen courses as "of great value". These are as follows:

a.	ED EL 464 (student teaching)	100.0%
b.	ED EL 360 (Principles of teaching-participation at Burris Sch.)	93.5%
c.	ED EL 460 (Student Teaching	93.3%
d.	ED Rdg 400 (Tch. Reading)	85.1%
e.	Math 391 (Tch. Math in El Sch)	84.0%
f.	ED EL 201 (Intro. to Elem. Sch.)	83.8%
g.	ED EL 101 (Intro. to Tch in Elem. School)	81.7%
h.	Sp. Ed 201 (Intro. to Exceptional Child)	77.2%
i.	Ed. Rdg. 430 (Corrective Reading)	76.3%
j.	ED EL 380 (Teaching of Language Arts in the Lower Elementary Grades)	65.9%
k.	Lib 461 (Materials for Children)	63.8%
l.	Eng. 331 (Children's Literature)	61.1%
m.	Ed Psych. 250 (Education Psych.)	52.9%

Please Evaluate The Courses as the EL ED Program

You may rate them according to their general value in your life or rate them according to how much they assist you in preparing to teach.

	COURSES	Of great Value	Of moderate Value	Of Little Value	Have not Taken Course
2.5%	MUSED 164 - Sensory Awareness and Response to Music	19	59	74	41
16.5%	MUSED 266 - Basic Music for Classroom Teachers	23	85	31	54
43.2%	ENG 103 - English Composition	74	73	24	22
41.5%	ENG 104 - English Composition	71	79	26	17
31.4%	ENG 205 - World Literature 206 - World Literature Masterpieces	49	70	37	37
40.0%	SPCH 377 - Speech for Elementary Teachers	48	49	23	73
61.1%	ENG 331 - Childrens Literature	55	28	7	103
63.8%	LIB 461 - Materials for Children	46	19	7	121
52.9%	ED PSY 290 - Educational Psychology	80	56	15	42
85.1%	ED RDG 400 - The teaching of Reading in Todays Schools	143	21	4	25
76.3%	ED RDG 430 - Corrective Reading in Classroom	84	19	7	83
26.0%	BIO 102 - Biological Concepts for Teachers	36	61	41	55
34.5%	ENG 310 - The Teaching of Language Arts in the Upper Elementary Grades	38	54	18	83
20.8%	GEOG 111 - Physical Geography/Earth Science concepts for Teachers	29	59	51	54
40.1%	MUSED 368 - Teaching Music in the Elementary School	41	38	23	91
45.6%	PHYCS 101 - Physical Science Concepts for Teachers	58	50	19	66

	COURSES	Of great Value	Of moderate Value	Of little Value	Have not Taken Course
26.8%	AED 300 - Art in the Elementary School	26	43	28	96
22.4%	AED 100 - Introductory Drawing and Painting	42	78	67	6
9.9%	HIST 153 - The World in Recent Times	17	72	82	22
81.7%	ED EL 101 - Intro to Teaching in the Elementary School	103	16	7	67
16.7%	AED 200 - Intro Printmaking and Sculpture	27	75	59	32
24.8%	HIST 203 - The Recent Past in the United States	41	73	51	28
23.5%	HIST 415 - History of Indiana	4	7	6	176
16.6%	POLS 130 - American National Government	23	46	69	55
21.9%	POLS 237 - State and Local Politics	9	16	16	152
83.8%	ED EL 201 - Intro to Elementary School Classroom Organization and Management	119	19	4	51
93.5%	ED EL 360 - Principles of Teaching and Classroom School	145	8	2	38
65.9%	ED EL 380 - The Teaching of Language Arts in the Lower Elementary Grades	95	42	7	49
36.3%	ED EL 410 - The Social, Historical, and Philosophical Foundation of Elementary Education	36	34	29	94
37.2%	HSC 350 - School Health Practice	44	50	24	75

	COURSES	Of great Value	Of moderate Value	Of little Value	Have not Taken Course
93.3%	ED EL 460 - Student Teaching Elementary School	14	1	0	178
100.0%	ED EL 464 - Student Teaching Elementary School	15	0	0	178
33.3%	ASTRO 101 - Astronomy Materials for the Teacher	5	2	8	178
23.0%	NR 105 - Conservation for teachers	3	5	5	180
84.0%	MATH 391 - Teaching Mathematics in the Elementary School	58	9	2	124
47.2%	MATH 201 - Cardinal Numbers in the Elementary School	87	79	18	9
49.7%	MATH 202 - Rational Numbers in the Elementary School	86	66	21	20
44.1%	MATH 205 - Real Numbers in the Elementary School	64	58	23	48
46.0%	MATH 206 - Geometry in the Elementary School	59	49	20	65
22.8%	BIO 103 - Field and Classroom Experiences in Biology for teachers.	8	13	14	158
32.4%	HSC - Elements of Human Health	24	35	15	119
77.2%	SPCED 201 - Intro to Exceptional Children	129	30	8	26
52.4%	ED PSY 250 - Human Growth and Development	95	67	19	12
23.0%	HFN 240 - Nutrition	36	72	48	37
26.9%	IED - Industrial Arts for Elementary Grades	34	70	22	67
54.7%	PEP - Physical Education in the Elementary School	58	39	9	87
42.0%	SS 391 - Teaching Social Studies in the Elementary Schools	37	27	12	117

APPENDIX B

John P. Sikula and Robert Roth have summarized recent changes in institutional teacher education requirements in a Phi Delta Kappa Fastback (202) entitled Teacher Preparation and Certification: The Call for Reform (1984).

In Indiana there are four major state universities and about 30 smaller colleges and universities that prepare teachers. In all four major state institutions (Ball State University, Indiana State University, Indiana University, and Purdue University), and most of the smaller programs as well, the entrance requirements for teacher education programs have been stiffened since Rules 46-47 became effective in 1982. Rules 46-47, which were adopted and promulgated by the Indiana State Board of Education Commission on Teacher Training and Licensing, require all teacher preparation programs to provide early and continuing field experiences. Individual programs are encouraged to be innovative and to reflect unique institutional approaches while still meeting state minimum requirements. Coursework in reading and additional work in written and oral communication are required for all teachers. In effect, the entire state teacher preparation system was revised. Since then, different institutions have gone even further to upgrade their own program standards and expectations.

At Ball State, a GPA of 2.4 is required to enter the elementary education curriculum; the old standard was 2.2. Admission into student teaching now requires a 2.5 GPA (formerly 2.2); while certification in elementary education now requires an overall GPA of 2.5 (formerly 2.2) and a 2.7 in professional education courses. Secondary education students need a 2.6 GPA in professional education courses if they are to be recommended for certification.

At Indiana State University a 2.2 overall GPA is required of all teacher education graduates (the old standard was 2.0). Students are required to have a 2.2 in subject matter courses with no grade less than a C. In 1983 two new content courses were added to the professional sequence: Multicultural Education and Special Students in Regular Classrooms. The ISU School of Education is also beginning a program to measure student proficiency in math and English.

Indiana University's new teacher education standards became effective in August 1983. Several significant changes were made, including:

Admission into the teacher education program now requires a 2.3 overall GPA (the previous standard was 2.0);

Students are now required to pass a test of reading and writing;

Elementary education students are now required to pass a standardized math test;

A new system to detect unsatisfactory progress is now used to monitor students.

Purdue University has recently raised the GPA required to get into math and special education programs. For entrance and retention in teacher training programs, Purdue is now using a screening procedure for oral expression, speech and hearing, math, and writing. SAT mathematics scores are also used for admission. Students scoring less than 450 on the SAT mathematics section must pass a college-level math course.

APPENDIX C

Organizations belonging to the Collaborative on Thinking:

American Association of Colleges for Teacher Education

American Federation of Teachers

American Association of School Administrators

American Educational Research Association

Association for Supervision and Curriculum Development

Council of Great City Schools

Home Economics Education Association

Institute for Development of Educational Activities

International Listening Association

International Reading Association

Music Educators National Conference

National Art Education Association

National Association of Black School Educators

National Association of Elementary School Principals

National Council for the Social Studies

National Council of Teachers of English

National Council of Teachers of Mathematics

National Education Association

National School Boards Association

National Science Teachers Association

National Congress of Parents and Teachers

National Association of Secondary School Principals

National School Public Relations Association

APPENDIX D

NATIONAL ASSESSMENT RESULTS

17 YEAR OLDS

READING		
Read for inferences	1971--64%	1980--62%
Analyze a passage for mood	1971--51%	1980--41%
WRITING		
Write persuasively	1974--21% Competent	1979--15% Competent
MATHEMATICS		
Understand mathematics	1973--62%	1978--58%
Apply mathematics	1973--33%	1978--29%
SCIENCE		
Classify (physics)		1977--44%

"This pattern is clear: the percentage of students achieving higher order skills is declining."

Percent not competent ranges from 38% to 85%.

--Education Commission of the States, 1982

APPENDIX E

1. Michael had a problem with his paper route. People on his route were not paying him on time. For several weeks when he went to pay his bill, he was short. He decided to discontinue service to the people who were always late with their payments. This caused some people to become angry and several of his customers called his manager. Michael then asked his mother to accompany him on collection day and after a few weeks his problem ended.

2. Nathaniel was visiting Terren. Terren's father had told Terren to mow the lawn. Terren dropped a lighted match into the gasoline can and burned his hand. Nathaniel remembered his mother putting ice water on a burn, so he ran in the house, got a plastic bag, filled it with ice and water, and told Terren to put his hand in the bag. Then, Nathaniel called his mother for help.

3. Glenda's mother sent her to the store to buy two giant sandwich size loaves of bread, at 69 cents a loaf. When Glenda got to the store, she noticed that regular size bread was on sale at 3 loaves for one dollar. After reading the labels, she decided that three loaves of bread, weighing 20 ounces each, was more bread than two giant size loaves weighing one and one-half pounds. Also, the three loaves of bread were less expensive to buy. Glenda bought the 3 loaves of bread for one dollar, and explained what she had done to her mother. Her mother was pleased.

4. Julie, her sister, and a friend were walking home from the shopping center when a car stopped next to them. The man in the car asked where West 33rd Street was. Julie told him he was on East 33rd Street, and was about to give him directions when she noticed he was exposed from the waist down. She screamed and told the other girls to run. Her friend said they should go to someone's house and call the police. Julie looked around the neighborhood for a safe house to run to, and quickly decided to go to the white house with red trim. She remembered going to that house once, with her father. When she got to the house, she explained to the people what had happened and why she came to their house. She then asked to use the phone to call the police. When the policeman arrived, Julie had to give a description of the man and the automobile he was driving. She didn't remember to get the license number. The policeman drove the girls home and talked with their parents. Julie decided to never talk to strangers again.

5. Candy would sometimes get angry when she had to wash dishes. There are 6 children in her family and there are always plenty of dishes. She thought it was unfair the way her mother would randomly decide who's day it was to wash dishes. Somehow, it always seemed that she had to wash dishes more often than each of her 3 sisters. Candy tried to convince her sisters that it would be much easier if each girl did dishes for a full week. This way each of the girls would have 3 weeks of vacation from dishwashing, and they wouldn't have to fight about who was going to wash the pot that was left soaking overnight. Candy said she would take the first week of dishwashing. Her sisters liked the idea and now Candy doesn't mind washing dishes nearly as much as she once did.

6. A's mother is fixing dinner and she tells A to entertain her 4-year-old sister for 15 minutes. A decides the best way to do this is to take her sister outside and to play a game. She talks to her sister and makes several suggestions about games she thinks her sister might like to play. A's sister decides on a game that requires kicking a ball, so they both look for a ball. Then A and her sister take the ball outside for the game. A checks her watch to be sure when the 15 minutes is over.

7. S was given three dollars to pay for his and his sister's lunch at school. Each lunch is $1.45. S decides that since the lunches are paid for as each person goes through the line and he eats 15 minutes earlier than his sister that he will ask the lady taking the lunch money to take out an extra $1.45 for his sister's lunch and write it down by her name as already paid. Deciding this, he tells his sister to give the lady in the cafeteria line her name and remind her that her brother has already paid for her lunch.

8. S heard from a neighbor that his area was going to form a flag football league. S asks his parents if he may play on one of the teams, and is given permission. He wants to find out more information about the league, so he asks his teacher at school. She sends him to the office to ask. There S is given a permission slip and an information sheet about a meeting to be held for children and their parents. At this meeting S is chosen for a team, given a list of rules and regulations and told to list his preference for playing position. At a later meeting he is given a schedule of games which his mother tells him will be his responsibility to remember. He also has responsibility for his team shirt and belt.

9. Michelle wanted to be in the school talent show, but she didn't know what to do. She and a friend wrote a play based on the television show "What's Happening." Michelle and her friend made the scenery for the play. They found other classmates to fill the parts of the play. They practiced the play for many days. The play was a success.

10. Brian got a 22 caliber rifle for Christmas. Because he lives in the city, he has no place to shoot the rifle at his house. He asked a friend who lives in the country if he could shoot the rifle at his house. After Brian's friend agreed to let him come, Brian asked his mother if she would take him there. Brian's mother said she was going for a cook-out so he decided to wait until his father came home from work and ask him. His father agreed to take him to his friend's house.

11. Jeff and his brother each have a room. They have a T.V., a stereo, an air conditioner and a fan to put into their rooms. Jeff wanted the T.V. and the air conditioner, but his brother would not agree to that. Jeff said he would let his brother have the T.V. if he could have the air conditioner. Jeff had the air conditioner and the stereo, and his brother had the T.V. and the fan. They decided to draw straws to see who got first pick, and Jeff won. He chose the air conditioner, then his brother took the T.V., Jeff chose the stereo and his brother got the fan.

12. Nancy wanted to buy a new 10 speed bike but her parents would not let her withdraw the money from her savings account. She heard from a friend about a job detasseling corn so signed up to do it during the summer. It would not take her whole summer but she would make enough to pay for the bike that she wanted after she sold her old bike to a cousin.

13. Pat has the job of cleaning up the apples that fall from their tree each week. He gets paid a weekly allowance for doing this. He decided that he would pay half of his weekly allowance to a friend to help him pick them up because it was really boring doing it alone.

14. Kris babysits to earn extra money. She said that sometimes, she finds it hard to keep the children entertained. She starts out by asking them what they would like to do. Then she goes to their closet (full of toys) and tries to get them interested in something there. She takes them for a walk or colors with them.

15. Ann has a good friend that lives on the other side of town. Although they go to the same school, they have a problem seeing each other during the summer. Ann calls her friend every couple of days to keep in touch. About once a month, they take turns spending the night at each other's house. They go to the show and go swimming. Ann plans on asking her friend to a July 4th party so they can get together. Ann said that she tries to plan as many things with her friend as possible so they can stay close over the summer months.

16. Shelly, her sister and brother planned a 15th wedding anniversary dinner for their parents. First, they decided what they were going to have for dinner. They found what things they had and what was needed from the store. A neighbor took them to the grocery to buy the additional supplies with their allowances. They all did their share in cleaning the house and setting the table. They got together and decided what their parents needed for an anniversary gift, chipped in and bought a brownie sheet pan.

17. Missy just moved into a new neighborhood. Missy is very shy and finds it hard to meet friends. She said that she had been making a big effort to meet new friends. She lives near a park and goes there to play. Children her own age come up and talk to her. She said that they play games that she doesn't necessarily like, but she goes along with them because she wants them to like her. She invites them over to her house and sometimes suggests new games.

18. Lisa has a nine year old brother who, she claims, starts fights with her. She doesn't like to fight with him. Her first step is to try and ignore him and get out of his way. She tried talking to him but that didn't seem to help. Her third device is to go tell her Mom. The first one works more than half the time, the second never works and the third always works.

19. Kirk ordered a magazine through a scholastic book club at school. This was ordered and paid for in March. By the middle of June, he still hadn't received it and became worried. He called other students in his class who had also ordered the magazine to find if they had received theirs. Finding that no one else had theirs, he called the teacher who had ordered the magazine for him to find out if she had any information concerning this. She gave him the address of the company. He wrote and was sent the magazine a week later.

20. During baseball, Tyler was in a midseason slump. He was given many suggestions of ways to improve his game. Due to his hot temper, he did the opposite, causing him to constantly strike out. It was also causing father-son problems since his father was the coach. His father finally suggested that he choke up on the bat. Due to peer pressure and embarrassment he tried this, rather than all the suggestions he was bombarded with. It worked, improving his game and his relationship with his father.

21. Jim, a new boy at school, wanted to try out for basketball. Practice began at 4:30 and the school rule states that students must go home directly after school unless directly supervised by a teacher. School gets out at 2:30. Therefore, Jim had two hours to go home and get back to school. His parents both work and he had no way of getting back to school. He knew no neighbors or relatives who could give him a ride. He did some checking during the day to see if anyone lived near enough to pick him up. Jim also asked his teachers to check with their students. By the end of the day, he found a ride, called his father at work to inform him of his afterschool plans and was able to make the practice.

22. Mike broke a lamp while over at an aunt's house. He and his friends were throwing

a frisbee which caused the lamp to fall over and break. Mike decided that he would blame the broken lamp on his aunt's bulldog. After reconsidering, he figured that if he was caught lying about it, he would be in more trouble than if he told the truth and took the blame. Mike explained what had happened and as a result, worked for his aunt doing odd jobs until the lamp was paid for.

23. Tom has a paper route. One of his customers would not answer the door when Tom went to collect his money. The next time Tom went to collect, he rang the bell and hid so the people could not see who was at the door. When they came to see who was at the door, Tom asked them for his money and got it.

24. Jamie wanted a new bicycle. She asked for one for her birthday. Her mother informed her that there was not enough money at the time to purchase one. At that, Jamie asked what her mother could contribute. Her mother said she would put up half of the cost. Jamie decided to work for the money. She ended up working at the concession stand at the ballpark to put up her half of the money to buy the new bike.

25. Jeff had to make a decision of going on a vacation to Florida with his family or staying at home to participate in an important baseball tournament. He asked for advice from several people. His father told him that it was his decision. His mother said to stay home. His best friend told Jeff of a similar experience where he had missed a trip to King's Island for baseball and that it was really worth it. Jeff said what really provided the answer was the weather. He thought that since it was so hot up here, it must be hotter and more uncomfortable in Florida. He stayed home for the baseball season.

26. Tim's father owed Tim eight weeks of allowance. Tim thought his allowance was one dollar a week and that his father owed him eight dollars. His father told him that he was wrong and that he only owed him 50 cents a week which added up to four dollars. As they discussed the matter, Tim sensed his father's increasing anger. Tim decided he better take the four dollars instead of what soon might be nothing.

27. Dawn was a new student at school. Unfortunately, her image at her past school was that she was known as a fighter. Knowing this, a girl in her class would deliberately antagonize her to get Dawn into trouble. Dawn realized that she did not have to continue this unfavorable image. She asked her teacher to move her away from the girl. She also tried to associate with girls who accepted her. She ignored the girl who caused trouble. In the end, Dawn succeeded in going her own way and changing her image.

28. Jeanne, who was overweight and shy, did not have many friends. She decided to join the art club where her talents might be appreciated. She showed an incredible ability in her artwork and organized many art activities. As a result, children noticed her leadership and capabilities. She gained many new friends as well as personal confidence.

29. Alan was concerned over the fact that he really liked a girl. He wanted to find a way to get the girl to notice him. He asked his teacher, and she advised him to consider what the girl might be looking for. Alan decided to improve his appearance by combing his hair and tucking in his shirt. Then, he thought the only other thing he could improve was his personality--by being polite. Although Jenny never paid much attention, he gained confidence by continuing to be clean and neat and showing a courteous behavior towards everyone.

30. Cindy's problem was how to raise enough money to buy a $50.00 bike. Cindy's parents made a deal with her that if she would do all her chores for a whole week, she would earn an allowance of $1.50 every Friday. A chart was made and hung on the kitchen wall. Eacy day, if all her chores were completed, Cindy received a check mark. If she only did half her chores, she would only receive half the money on Friday. One of Cindy's main problems was to figure out how long she would have to work in order to save enough money for the bike. Cindy's parents decided to help out with half ($25.00) of the money. After three months Cindy had the other $25.00 saved, and bought the new bike. Cindy's main problem, during the three months, was organizing her time each week to complete all her chores by Friday, in order to earn the maximum amount of money. (Three weeks, she did not get her entire sum.)

31. Heather had a problem with her two-year-old brother getting into her room. She often had to entertain him, in order to keep him clear of her personal belongings in her room. She had several ways of distracting her brother:
    1. shutting her door
    2. bribing with chewing gum or candy to play away from her room
    3. telling her brother that his mother was calling him
    4. asking her father for a lock on her bedroom door

    Most of the time her methods of distracting him worked very well.

32. Krista had a pet rabbit. Her responsibility was the care of the rabbit. She had to see that the rabbit was fed, given water, love, and attention. She and her father had made an 8-foot cage. It had an enclosed box at one end, with an entrance to go in and out. This is where Krista kept clean newspapers for a bed, and the water and food dishes. The other 6 feet was a wired pen, where the rabbit could go to get fresh-air and exercise. Krista fed the rabbit lettuce and carrots two days a week, and rabbit chow on the remaining days. One major problem Krista had was keeping the rabbit alive this past winter when the temperature was 25 degrees below zero. She moved the rabbit cage into the garage. Then she put a large tarp of material over the cage to act as an insulator from the wind and low temperatures. The final step was shredding pieces of newspaper and putting them in the box for the rabbit to make a nest to snuggle under and sleep in. Krista also had to check the water dish every day to make sure it did not freeze. The rabbit lived through the zero temperatures just fine. Krista has to organize her time during the day to give her pet the attention it needs.

33. John has a Press paper route. Besides the responsibility of distributing the papers in good and bad weather, he has to collect his money each week to turn in to the paper office. John has to organize his daily time schedule in order to get his route covered each day between 3:30 and 5:00. In the summer John says he has very little trouble keeping on a schedule. But when school is in session, some nights it is hard to be home by 3:30 to begin his duties. John runs cross country in the fall, which makes for a later distribution on his paper route--usually between 5:30 and 6:00 each evening. John said he has had problems with customers demanding their newspapers be delivered by 5:00 p.m. One night a week, usually Thursday or Friday, John has to collect his money from the customers. This can cause problems unless he carries at least $3.00 to $5.00 worth of change when he starts out. Also, John keeps an account of who has paid and which people were not at home for collection. Each week the money must be collected and turned into the Press office. John keeps out his percentage and a log of where his money is going.

34. Renee' helps her mother with the grocery shopping. She keeps a running list of what the family needs. She clips coupons from the magazines and saves them. Renee'

also checks the ads from the local grocery stores to compare prices for her mother.

35. Jennifer found a dollar bill at the movies. She went to the manager to give the money to him. He thanked her for her honesty. He took her name and address and told her that if no one claimed it, he would mail it to her. Three days later she received the dollar in the mail.

36. M had thrown a rock at a nest of baby blue jays. One baby jay fell to the ground. There were some girls around and they told him how awful he was, so he took the bird home. The bird grew and grew to be a healthy bird. But M felt he had a problem. The bird would only eat when M. fed him from his hand. M. knew he would have to let the bird go someday but he was afraid he would die from not eating. M. decided to turn the bird free. Hours passed and the bird didn't come back. So M. decided to put some bread crumbs on his window sill. Finally the bird did come back and he ate the crumbs from the window sill.

37. Mary's teacher was getting married and Mary wanted to do something for her. So she decided to buy her a blender. (She had asked another teacher for suggestions.) The blender cost $25.00. In her open-concept 6th grade class there were 62 students. So Mary thought. She divided to see how much per person she would need. It came out to about 40¢. Then she added an extra nickel for a card and some wrapping paper. The children would pay 45¢. Many students brought in their money but some couldn't. Other students brought in extra money. Then Mary discovered she had more than enough money, so when she bought the blender, paper, and card she had $2.00 left. She had kept track of the money each student had brought so she asked them what they wanted done. The students decided to buy their teacher some cooking utensils, carrot peeler, wooden spoon and a pizza cutter. Her money came out exactly right.

38. Jill had a twin sister, Jan, who constantly was throwing her clothes and things all over their room even on Jill's bed. Jill was a very neat girl and begged Jan to pick up. She even picked up her things some time. So Jill decided to make a deal with Jan. Every time the room was in perfect condition Jill would give Jan some candy, gum, and etc. (Jan loved to eat.) Jill said that it worked most of the time. She had pretty well solved her own problem.

39. Martinez moved with his family into a new section of town. When he arrived he looked out on the new and strange city streets, noisy with traffic and walled in by buildings, so unlike the neighborhood he had come from. M. didn't have any friends. He needed help in finding some. Finally he decided to take his baseball glove outdoors to see if he could find some boys to play with and make some new friends. He found a game in progress and he watched it from the sidelines. Martinez speaks only Spanish. Being afraid, he went home. Another week passed and Martinez determined to make friends, went back to where the boys played baseball. Finally a fly ball came toward Martinez and he caught it. He soon played baseball with them, and he made some friends.

40. Lisa had always wanted to play basketball with a team. So she went out for their 6th-grade team, but there was not a girls' team. The coach told her she could join. But when the boys found out, they laughed at her. Determined to prove to the boys that she was just as good as they were, she practiced every morning and evening. She trained like a professional athlete (that's what her father called her). When practice did start, the boys were still laughing at Lisa, but when

she started to play one on one or on teams, the boys really watched her. They didn't laugh any more. In fact, Lisa said that some of them asked her what she did to become so good. So some of them started running with her and playing with her after school.

41. Marie told of some problems she had with her sisters. She was the middle girl in the family. Her oldest sister could play the piano beautifully, her younger sister could do lots of acrobatics, and Marie felt like she couldn't do anything as well as they did. She tried to play the piano but her fingers just wouldn't work right. Then she also tried to do somersaults, but Marie just couldn't quite get the hang of it. She thought of something she might do that her sisters couldn't do or wouldn't want to do. She started cooking. (with a little help from the cookbook). She made some cookies and her sisters really liked them. So Marie did more and more cooking and then her sisters asked for her to help them learn how to cook.

42. S has been wanting a 10 speed bike for several months. Her mother says she cannot have one until she learns to take care of the things she already has. She began to keep her room very neat and her things out of the yard. Also she begins saving $2.00 out of the $3.00 she gets for helping her mother with housework. She did this for sixteen weeks without telling her parents. She had saved $32.00 when she told her parents. They were so proud of her that they began looking for a used 10-speed. They found one for $90, and her parents paid the difference.

43. B's class is initiating a money project at school where they use play money. They get paid a certain amount and have to pay for certain things in the classroom. The class is told to think up a way to raise money. B decided to bring his old comic books to school and have a comic book rental library. He rented each comic book for 25¢ an hour.

44. L was new in school and wanted to be a cheerleader. She made friends with some girls who were practicing at recess. They taught her the cheers. She kept practicing with them until she was very good. She was friendly to everyone, even the children others didn't like. When the election came around, she was elected.

45. C. was left alone in the house while her parents went to a meeting. They were only going to be gone for two hours. After about an hour had passed C noticed that a car kept going by the house very slowly and then speeded up as it passed the house. One time it stopped completely and sat in front of the house. C was so scared, she turned out all the lights, went outside, and sat in the woods with her dog until her parents got home.

APPENDIX F

GOALS FOR A CRITICAL THINKING CURRICULUM - ROBERT ENNIS

WORKING DEFINITION: Critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do. 1

Critical thinking so defined involves both dispositions and abilities:

A. Dispositions

1. Seek a clear statement of the thesis or question
2. Seek reasons
3. Try to be well informed
4. Use credible sources and mention them
5. Take into account the total situation
6. Try to remain relevant to the main point
7. Keep in mind the original or basic concern
8. Look for alternatives
9. Be open-minded
   a. Consider seriously other points of view than one's own ("dialogical thinking")
   b. Reason from premises with which one disagrees-without letting the disagreement interfere with one's own reasoning ("suppositional thinking")
   c. Without judgment when the evidence and reasons are insufficient
10. Take a position (and change a position) when the evidence and reasons are sufficient to do so
11. Seek as much precision as the subject permits
12. Deal in an orderly manner with the parts of a complex whole
13. Be sensitive to the feelings, levels of knowledge, and degree of sophistication of others. 2

B. Abilities

Elementary clarification:

1. Focusing on a question
   a. Identifying or formulating a question
   b. Identifying or formulating criteria for judging possible answers
   c. Keeping the situation in mind
2. Analyzing arguments
   a. Identifying conclusions
   b. Identifying stated reasons
   c. Identifying unstated reasons
   d. Seeing similarities and differences
   e. Identifying and handling irrelevance
   f. Seeing the structure of an argument
   g. Summarizing
3. Asking and answering questions of clarification and challenge, for example:
   a. Why?
   b. What is your main point?
   c. What do you mean by...?
   d. What would be an example?
   e. What would not be an example (though close to being one)?
   f. How does that apply to this case (describe case, which might well appear to be a counterexample)?
   g. What difference does it make?

h. What are the facts?
i. Is this what you are saying: _____?
j. Would you say some more about that?

Basic support:

4. Judging the credibility of a source; criteria (that are often not necessary conditions):
   a. Expertise
   b. Lack of conflict of interest
   c. Agreement among sources
   d. Reputation
   e. Use of established procedures
   f. Known risk to reputation
   g. Ability to give reasons
   h. Careful habits
5. Observing and judging observation reports; criteria (that are often not necessary conditions):
   a. Minimal inferring involved
   b. Short time interval between observation and report
   c. Report by observer, rather than someone else (that is, the report is not hearsay)
   d. Records are generally desirable. If report is based on a record, it is generally best that:
      (1) The record was close in time to the observation
      (2) The record was made by the observer
      (3) The record was made by the reporter
      (4) The statement was believed by the reporter, either because of a prior belief in its correctness or because of a belief that the observer was habitually correct
   e. Corroboration
   f. Possibility of corroboration
   g. Conditions of good access
   h. Competent employment of technology, if technology is useful
   i. Satisfaction by observer (and reporter, if a different person) of credibility criteria

Inference:

6. Deducing and judging deductions
   a. Classic logic--Euler circles
   b. Conditional logic
   c. Interpretations of statements
      (1) Negation and double negation
      (2) Necessary and sufficient conditions
      (3) Other logical words: "only," "if and only if," "or," "some," "unless," "not both," and so on
7. Inducing and judging inductions
   a. Generalizing
      (1) Typicality of data: limitation of coverage
      (2) Sampling
      (3) Tables and graphs
   b. Inferring explanatory conclusions and hypotheses
      (1) Types of explanatory conclusions and hypotheses
         (a) Causal claims
         (b) Claims about the beliefs and attitudes of people
         (c) Interpretations of authors' intended meanings
         (d) Historical claims that certain things happened

(e) Reported definitions
(f) Claims that something is an unstated reason or unstated conclusion

(2) Investigating
(a) Designing experiments, including planning to control variables
(b) Seeking evidence and counterevidence
(c) Seeking other possible explanations

(3) Criteria--given reasonable assumptions:
(a) The proposed conclusion would explain the evidence (essential)
(b) The proposed conclusion is consistent with known facts (essential)
(c) Competitive alternative conclusions are inconsistent with known facts (essential)
(d) The proposed conclusion seems plausible (desirable)

8. Making and judging value judgments
a. Background facts
b. Consequences
c. Prima facie application of acceptable principles
d. Considering alternatives
e. Balancing, weighing, and deciding

Advanced clarification:

9. Defining terms and judging definitions; three dimensions:
a. Form
(1) Synonym
(2) Classification
(3) Range
(4) Equivalent expression
(5) Operational
(6) Example and nonexample

b. Definitional strategy
(1) Acts
(a) Report a meaning
(b) Stipulate a meaning
(c) Express a position on an issue (including "programmatic" and "persuasive" definition)

(2) Identifying and handling equivocation
(a) Attention to the context
(b) Possible types of response:
(i) "The definition is just wrong" (the simplest response)
(ii) Reduction to absurdity: "According to that definition, there is an outlandish result"
(iii) Considering alternative interpretations: "On this interpretation, there is this problem; on that interpretation, there is that problem"
(iv) Establishing that there are two meanings of a key term, and a shift in meaning from one to the other

c. Content

10. Identifying assumptions
a. Unstated reasons
b. Needed assumptions: argument reconstruction

Strategy and tactics:

11. Deciding on an action
    a. Define the problem
    b. Select criteria to judge possible solutions
    c. Formulate alternative solutions
    d. Tentatively decide what to do
    e. Review, taking into account the total situation, and decide
    f. Monitor the implementation
12. Interacting with others
    a. Employing and reacting to "callacy" labels (including)
        (1) Circularity
        (2) Appeal to authority
        (3) Bandwagon
        (4) Glittering term
        (5) Namecalling
        (6) Slippery Slope
        (7) Post hoc
        (8) Non Sequitur
        (9) Ad hominem
        (10) Affirming the consequent
        (11) Denying the antecedent
        (12) Conversion
        (13) Begging the question
        (14) Either-or
        (15) Vagueness
        (16) Equivocation
        (17) Straw person
        (18) Appeal to tradition
        (19) Argument from analogy
        (20) Hypothetical question
        (21) Oversimplification
        (22) Irrelevance
    b. Logical Strategies
    c. Rhetorical Strategies
    d. Presenting a position, oral or written (argumentation)
        (1) Aiming at a particular audience and keeping it in mind
        (2) Organizing (common type: main point, clarification, reasons, alternatives, attempt to rebut prospective challenges, summary--including repeat of main point

[1]For an elaboration of the ideas in this set of proposed goals, see Robert H. Ennis, "Rational Thinking and Educational Practice," in Philosophy and Education (Eightieth Yearbook of the National Society for the Study of Education, Part I), ed. Jonas F. Soltis (Chicago:NSSE, 1981)

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